The microfoundations of Hawtrey's Good and Bad Trade

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1 Introduction

Good macroeconomic theory has microfoundations. This has been the dominant view for more than 30 years and it does not look like things will change much anytime soon.[1] Since the rise to prominence of New Classical (NC) macroeconomics, microfoundations have been considered as the criteria separating science from alchemy: good macroeconomics is firmly based on microeconomic theory, a postulate that translates itself into mathematical models that feature explicitly the optimization problem of the individual agent. As the new classicals see it —what Hoover (2012) calls the "mainstream narrative"— they were the ones who grounded macroeconomic analysis on microeconomic theory, putting an end to an era characterized by models specified in terms of aggregates.

This insistence on providing microfoundations for macroeconomics is understandable if only because it is perfectly sensible to think that, since it is individuals who make up the economy, their behavior should be the basis for the study of aggregate phenomena. However, microfoundations has proven to be a considerably more complex issue, and the NC approach to dealing with the relation between micro and macro is not the only one. In fact, Hoover (*ibid*.) identifies two other microfoundational programs and traces the beginning of the discussion around this issue —the "prehistory" of microfoundations— to the introduction of the terms "microeconomics" and "macroeconomics" in the 1930s. The main characters in this "prehistory," Frisch, Keynes and Hicks

> …clearly understood that the issue of the relationship of macroeconomics to microeconomics was important, and they contributed elements on which the later systematic microfoundational programs built, but they did not themselves turn the relationship of macroeconomics and microeconomics into a systematic program of inquiry pursued for its own sake. (Hoover 2012: 28)

It was during this period that the problem of microfoundations was articulated, mainly because it was then that the categories of macroeconomics and microeconomics explicitly came into being. But it was also during this period that the general framework

[1] See Garcia Duarte (2012) for a discussion of the role of microfoundations in contemporary macroeconomic theory.

for the discussion, that of formal mathematical models, was set. The three microfoundational programs identified by Hoover (2012) —Walrasian General Equilibrium, Laurence Klein's macroeconometrics, and the NC representative-agent program— are expressed in terms of mathematical models, and it is mostly with respect to the properties of those models that the microfoundations debate has been carried out.

The need to express arguments in the form of equations may motivate a clearer discussion of microfoundations on modern macroeconomics, but it does not mean that the issue of the compatibility between micro and macro was completely ignored or out of reach for authors writing before the 1930s. What I will argue in this essay is that there are things before this prehistory that are worth taking a look at. The purpose of this essay is to study the relation between individual behavior and aggregate phenomena in R. G. Hawtrey's first book, *Good and Bad Trade* (1913), as an example of the way in which this issue was treated before the prehistory of microfoundations. *Good and Bad Trade* offers an explanation of trade fluctuations where every movement in aggregate variables is traceable back to the behavior of individual agents, and Hawtrey approaches the relation between individual and aggregate phenomena in a distinctive way.

Ralph Hawtrey (1879-1975) played an important part in the development of macroeconomics, as has been shown by Deutscher (1990b) and Laidler (1999), [2] but his first book was not particularly well received among his peers.[3] Hawtrey's fame and influence were bolstered by his role in the Genoa Conference of 1922 (Howson 1985) and by his second book, *Currency and Credit (1919)*.[4] As for historians of economic thought, the consistency of his ideas over his life is often remarked[5] and, accordingly,

[2] For quantitative information about the importance of Hawtrey among his peers see Deutscher (1990b: 188ff).

[3] In their reviews of *Good and Bad* Trade Pigou (1913) and England (1914) both applauded the clarity of Hawtrey's exposition of trade fluctuations, but they also remarked that he had not actually made much of a contribution to our understanding of them. Dennis Robertson also reviewed the book and disagreed with the prominence given to monetary factors, which he saw as the consequence of Hawtrey's lack of knowledge of empirical data (Deutscher 1990b: 159). More recently, Bridel (1987) and Glasner (2013: 58-59) have highlighted several new contributions that GBT brought to monetary and business cycle theory.

[4] It went through four editions (1919, 1923, 1928 and 1950) and was used as a textbook during the 1920s, both in England and in the United States. See Hicks (1977: 118), Laidler (1993: 1077) and Toporowski (2005: 61).

[5] For example, Deutscher writes that "Hawtrey's economics, articulated over the course of a half century, was remarkably consistent and can be understood as a uniform theory" (1990b: 21). Laidler (1999: 112) points out that his writings are "repetitive" and that "ideas present in his first book ... were still present in

attention is given almost exclusively to the fullest and most refined expositions of his theory, notably *Currency and Credit* and *The Art of Central Banking* (1932). However, since the question about the treatment of the relation between individual behavior and aggregate phenomena in Hawtrey's thought has not been posed before, and as his first book was written when he apparently ignored most of the economic literature of the time,[6] *Good and Bad Trade* is perhaps the best place to start. It is a window into the purest form Hawtrey's ideas took, and it might motivate a more careful examination of the small changes that his theory suffered between individual works.

The strategy I follow in this essay is to identify the microeconomic and macroeconomic analysis present in *Good and Bad Trade* and to attempt to translate them into a set of equations whose components can then be discussed. Rather than to provide a fully functioning model of Hawtrey's theory, the purpose of this approach it to uncover problems of incompleteness and vagueness, and to identify possible sources of conflict between micro and macroeconomic behavior. This separation allows for an easier comparison with modern microeconomics and macroeconomics, and is fundamental for understanding the type of microfoundations that we find in Hawtrey's theory. Constraints of time and ability necessarily limit the scope of this attempt, but I believe it will be seen that this exercise can offer results sufficiently interesting to justify the strategy chosen.

The main result of the analysis of GBT's microfoundations is that the macroeconomics oversimplifies the microeconomics that, it will be argued, are present in the book. Hawtrey sees the realism of theory as a fundamental criterion of usefulness and

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his 1958 evidence to the Radcliffe Committee." Hawtrey acknowledged this consistency himself in a letter to Keynes in 1937 where he wrote: "I have adhered consistently to my fundamental ideas since 1913 and in so far as they have developed and grown the process has been continuous since then" (cited in Black 1977: 370).

[6] The connection between Hawtrey and Marshall spiked some controversy between commentators. For Bridel, Hawtrey's "general framework of analysis was Marshallian in each and every respect," and in GBT in particular he "borrowed" from Marshall as well as from Fisher (1987: 59, 67). Laidler has also insisted on the connection, stating that "the components out of which Hawtrey constructed his monetary theory of the cycle were undoubtedly of Marshallian origin" (1999: 105). On the other hand, Black (1977: 366), Howson (1985: 145) and Deutscher (1990a: 74) contest Hawtrey's classification as Marshall's follower made by earlier commentators, emphasizing the fact that he was never Marshall's pupil. In a letter to Guillebaud cited by Deutscher, Hawtrey himself contested his classification as a Marshallian. He stated that his theory "derived from the City traditions imbibed at the Treasury, and went back to Bagehot rather than to Marshall" (1990b: 247n5). Hawtrey also pointed out his ignorance regarding the economic literature of the time in the preface he added to the 1962 reprint of *Good and Bad Trade* (GBT: viii).

therefore sought to present an account of trade fluctuations where complex individual behaviors are involved. However, the dynamics he sees taking place at the aggregate level during trade fluctuations do not necessarily exhaust the possibilities that his depiction of individual behavior could allow for. In fact, in functional terms, his core theoretical argument is presented in such a way that the behavior of collections of agents of the same type is reduced to the behavior of a single agent. Although Hawtrey does explore some of the nuances introduced by the differences inside groups of agents, his core theoretical argument about trade fluctuations does not fully take into account the heterogeneity of agents. On the other hand, his depiction of individual behavior —as rich and complex as would be expected of someone concerned with realism— is somewhat incomplete and depends on notions that are rather vague and difficult to model. It is clear that theory demands sacrificing some of the complexity in order to remain tractable and therefore useful. However, in light of the difficulties encountered in relating modern micro and macroeconomics, it is interesting to go back to *Good and Bad Trade* and see just what Hawtrey left out.

This essay will continue as follows. The next section offers a general account of the microfoundations debate, centered on the analysis of the dominant view —the representative-agent program— that will provide the elements for a critical approach to GBT. Section three discusses the microeconomics of GBT. I will analyze the behavior of each of the types of agents that appear in Hawtrey's theory and provide a simple formalization of it in order to highlight the possible sources of trouble. Section four deals with the macroeconomic analysis of GBT. The theory of trade fluctuations, the thesis about the instability of equilibrium and the relation with the quantity theory of money will be discussed. Mendez' (2012) formalization of Hawtrey's macroeconomic theory —based fundamentally on the third edition of *Currency and Credit*— will be discussed as well. Section five concludes with an evaluation of the relation between micro and macroeconomics in GBT.

2 Microfoundations

In this section I will discuss microfoundations focusing mainly on the representative agent (RA) —the dominant form of microfoundations since the 1980s— but dealing also with the other two approaches identified by Hoover (2012). Contrary to their internal narrative, the NCs were not the first ones to reflect on the relation between micro and macroeconomics, and the other two microfoundational programs are closely related to the RA program: on the one hand there's general equilibrium theory, of which the NCs are confessed followers but whose results in aggregation theory they seem to ignore; and on the other hand there's Klein's macroeconometrics, which the NCs accused of lacking microfoundations and the discipline imposed by general equilibrium. The idea is that this account of the microfoundations issue will provide the elements to approach Hawtrey's GBT critically.

2.1 New Classical macroeconomics and the Representative Agent

The representative agent was already present in Lucas and Rapping's 1970 article (Hartley 1997: 20), but the first and rather primitive specifications were replaced around 1980 by an agent with rational expectations who maximizes his utility over an infinite horizon. The shift came hand in hand with the rise of the Real Business Cycles (RBC) literature, the second generation of NC macroeconomics,[7] but since then it has become a characteristic of macroeconomics in general. The representative agent is the NC's way of implementing microfoundations, so it is towards it (him, her?) that the criticism of NC microfoundations has been directed. However, this criticism is first confronted with the interesting fact that there does not exist a detailed defense of the use of a RA. In fact, it seems that the use of this device was not the result of a pondered choice, but rather, as

[7]Although RBC theorists see themselves as following in Lucas' footsteps, their differences should not be ignored. See Garcia Duarte (2012) for a discussion of the differences and the common ground between these two approaches, as well as a discussion of how this common ground later allowed the emergence of a New Neoclassical Synthesis, embodied in the Dynamic Stochastic General Equilibrium (DSGE) model.

Hoover puts it, NC macroeconomists "sleepwalked" into its use, which was already present in the growth literature of the time (2012: 50).[8]

Hartley (1997) identifies three motivations for using representative agents in new classical: (1) dealing with the Lucas critique, (2) facilitating the construction of Walrasian General Equilibrium models, and (3) providing microfoundations. As he points out this distinction is not neat but it is useful for expository purposes (Hartley 1997: 30), and it also allows us to see the connection with the other two microfoundational programs. I will now discuss each one of these motivations.

The Lucas critique

The Lucas critique of 1976 has a special place in the NC narrative since it is one of its founding episodes. The gist of the critique is that the type of models that were used by Keynesian macroeconometricians had a flaw: they assumed that the value of the parameters estimated didn't change after a policy regime shift. It was a fatal flaw since there is no reason to suppose that an agent's behavior, which accounts for the value of the parameters, stays the same after a policy has been implemented.[9] Therefore, what was needed were models where the individual's "deep," invariant parameters of tastes and technology were specified and the decision problem faced by the individual was explicit. This would provide an adequate way of evaluating economic policy.

On this account, the macroeconometrics of the time, whose most representative figure was Lawrence Klein, are presented as ignoring the relation between individual action and aggregates. However, as Hoover (2012: 39-45) shows, this is a misrepresentation that ignores completely Klein's own views on microfoundations. The Lucas critique did not actually meant passing from an approach that dished out individual behavior to an approach where individual behavior is present. What can be seen is one

[8]As Hartley indicates in the introduction of his book "It would be very convenient to be able to turn to the series of papers written by others in which the case for using representative agent models to study the macroeconomy is convincingly set forth. Unfortunately, such a series of papers does not exist. What does exist is a large set of introductions, paragraphs, and parenthetical asides that, when brought together, set forth the rationale for using representative agent models" (1997: 6).

[9]Ironically, the case can be made that Keynes had already pointed out this problem when he commented on Timbergen's 1939 books (De Vroey 2012: 181).

criterion of model building being replaced by another: what Lucas proposed meant changing an empirical criterion for a theoretical one. When Klein thought of the relation between micro and macro he approached it with the restriction of data in mind. His strategy consisted in working down from aggregate data as far as it was possible, moving in the direction of a fully disaggregated model; he hoped the Keynesian aggregates he was working with would not prove to be incompatible with microeconomic theory (Hoover 2012: 40-41). Lucas, on the other hand, made the compatibility of micro and macro a starting condition, and we can see how a RA model might help. With a model where those deep, unchanging parameters are specified as part of the description of the optimization problem of the RA (for example a firm maximizing profits or a household maximizing utility) the critique is avoided.

However, as Hartley points out, coping with Lucas's critique is not so easy (1997: 47-52). This is so mainly because the parameters representing tastes and technology specified in RA models are not necessarily invariant. For example, in a typical depiction of the consumer's problem the intertemporal discount rate is assumed to be invariant, but is it really so? Hartley points to changes in the wealth of the agent as being able to change it: it is sensible to think that poor people, living from day to day, do not have the same intertemporal discount rate as middle class people (p. 51), so there's ground for thinking that the intertemporal discount rate depends on wealth. As wealth is something that can clearly change with a policy regime shift, it is not evident why the intertemporal discount rate should be considered as an invariant parameter.

Hartley is critical of the usefulness of Lucas critique itself (pp. 53-55), but what's worth noting for our purposes is that the success of the RA in overcoming it is far from clear. Furthermore, although the critique does invite to start from individual behavior, this does not mean that the analysis must be based on one "representative" agent. Evidently, however, using a RA does make things easier, and this brings us to the second motivation for using RAs.

Facilitating the construction of Walrasian General Equilibrium models

General Equilibrium Theory, in its Arrow-Debreu form, is the role model of new classical macroeconomic theory. However, manipulating fully specified General Equilibrium models is simply too hard, as Lucas' 1972 "Expectations and the Neutrality of Money" showed, so some other device had to be found in order to do macroeconomics with rational expectations while being faithful to the (allegedly rock-solid) foundations provided by General Equilibrium Theory. Although in the paper all of the agents were identical except for the information they possessed, it provided

> ...a sort of theoretical reassurance that something that we cannot do in practice at least works in principle. In Lucas's case, it allows him to conclude that we could get the desired result out of a fully articulated general-equilibrium model with heterogeneous agents; and knowing that we could, it is OK to short-circuit the process and to work with much simpler models. (Hoover 2012: 48)

Hartley points out two justifications for using a RA model as a compact General Equilibrium model that can be identified in new classical literature. First, it is possible to simply assume that individual heterogeneity is not very important and that every agent is the same. In that case the use of a representative agent would just simplify the problem by eliminating the need to carry along the number of agents (1997: 67). Second, it is possible to exploit the second welfare theorem: by solving the RA's problem we find a Pareto optimum that can be supported as a competitive equilibrium allocation (p. 68). Both of them have serious problems. In the first place, assuming that heterogeneity does not matter is completely arbitrary. Secondly, using a RA, and therefore assuming that a set of agents can be represented by just one "representative" agent introduces an additional hypothesis that must be taken into account when analyzing the correspondence between the model and data. Finally, the conditions that allow representing a set of agents with a RA (Gorman's conditions) are very stringent, and the assumptions behind the second welfare theorem are so precise that the NC strategy would imply using very peculiar types of economies and agents that might not be interesting.[10]

[10]Preferences must be identical and homothetic. Hoover offers a useful illustration: "*Identical*: you and Bill Gates have the same preferences. *Homothetic*: Bill Gates, the billionaire, must spend the same proportion of his income on, say, chocolate as would an impoverished Bill Gates" (2010: 332). As for the welfare theorems, any deviation from perfect competition immediately invalidates them.

Additionally, however, a RA model is a compact and effective way of satisfying the requirement of "equilibrium discipline" which NC macroeconomists see as missing in Keynesian macroeconomics. For Lucas and the NC macroeconomists, a valid economic model must comply with two requirements that embody this discipline: "(a) agents act in their own self-interest and their behavior is optimal; and (b) markets clear" (De Vroey 2012: 170). These two postulates, De Vroey argues, are actually two sides of the same coin and are at the core of Walrasian thinking (2012: 174, 176). In a representative-agent model the solution to the optimization problem embodies at the same time a result of individual optimization and market clearing.

On the other hand, the affinity itself that NC macroeconomics wishes to maintain with GE theory is problematic given the negative results that were obtained in it during the 1970s. The results obtained by Sonnenschein, Mantel and Debreu were devastating for GE as a microfoundational program since they showed that aggregate excess demand functions were essentially arbitrary. This meant that the careful specification of individuals was not enough for having useful information about the aggregate behavior of the economy. Once the full extension of these results was established, it should have also been a devastating blow for NC macroeconomics' pretensions since it meant that their role model was not that perfect after all. However, NC macroeconomics and RA models gained force precisely in the decades following the Sonnenschein-Mantel-Debreu results. One of the main points of Kirman's well known 1989 and 1992 articles was that NC macroeconomics' program was ill founded since they completely ignored these results. Hoover insists on this point indicating that while critics of NC macro are well aware of its difficulties, "there is little evidence that advocates have even noticed the argument against their approach" (2012: 51).

The ideology of microfoundations

The last two subsections dealt with technical elements; this one deals with the need felt by new classical macroeconomists for explaining macroeconomics exclusively in terms of individual behavior. Some form of methodological individualism has always been common in mainstream economics, but new classical macroeconomics takes matters

to the extreme: from the three microfoundational programs that have been mentioned, only new classical macroeconomics goes beyond the understanding of the compatibility of micro and macroeconomics to the elimination of macro altogether.[11]

Hoover (2010: 330-331) characterizes the need for microfoundations as resting on three theses:

> 1. Individuals lie behind aggregates in the sense that without individuals there would be no aggregates.
>
> 2. How individuals behave affects or conditions how aggregates behave.
>
> 3. Aggregates are nothing else but summary statistics reflecting individual behavior.

The first two are rather conventional and new classical macroeconomists are not the only ones to agree with them. It is the firm defense of the third thesis that is characteristic of new classical macroeconomics, and that explains their wish to reduce macroeconomics to microeconomics. A great deal of the justification for this seems to stem from the Lucas critique and reassurance of the RA strategy is given by allusion to the second welfare theorem. The criticism of both of these elements was given above, but there is a problem with the very idea of using a RA to comply with the need to study individual behavior.

The issue here is of form versus content. As Hoover puts it, using a representative agent means solving

> ...an optimization problem with aggregate prices, wages, and interest rates, as if there were markets for GDP, aggregate labor, and aggregate money rather than markets for golf balls, accountants, and particular withdrawals from ATM machines. (2010: 333)

The appeal to individual behavior in such a type of models is merely rhetorical: aggregates are given a functional role instead of being considered a mere expression of individual behavior. And, therefore, as Hoover also notes, "to the degree that such models are successful in explaining empirical phenomena, they point to the ontological

[11] As Hoover puts it, "[t]he ultimate goal of the new classical economics is the euthanasia of macroeconomics" (cited in Hartley 1997: 121).

centrality of macroeconomic and not microeconomic entities" (1995: 253). Models with RAs, it turns out, do not actually implement microfoundations: they only mimic the mathematics used in their preferred form of microeconomics (Hoover 2010: 334). Furthermore, Hartley (1997: 175) points out just how narrow the type of microeconomics acceptable for providing microfoundations are when the RA is considered. As the ignorance of the results of aggregation theory shows, NC macroeconomics seems to have ignored as well the developments of contemporary microeconomics and is still clinging to a stringent form of constrained optimization.

2.2 Two alternative approaches

It is worth elaborating further on the two other microfoundational programs besides the representative agent that were mentioned: General Equilibrium Theory and Klein's macroeconometrics. Although they had different motivations and different views concerning aggregation, they both start from a Walrasian framework and hope to arrive at the kind of macroeconomic results stressed by Keynes; they are both part of the Neoclassical Synthesis. Also, for both of these programs micro and macroeconomics coexist: their goal was not the elimination of macroeconomics as is the case for the representative agent program.

As a microfoundational program General Equilibrium Theory goes back to Hicks' *Value and Capital* (1939), where he modified the Walrasian framework in order to better deal with expectations, incomplete markets and adjustment processes —the elements that according to him produced the type of macroeconomic results pointed out by Keynes. When dealing with the aggregation of individuals Hicks assumed that what was true for the individual was also true for a group of individuals. The theoretical support for this idea was what later came to be known as the "composite-commodity theorem," which indicates that when the prices of a group of commodities change in the same proportion they can be treated as a single commodity (Hoover 2012: 36). Gorman's work, however, would show that the applicability of this approach was very limited since preferences had

to be identical and homothetic.[12] According to Hoover (2012: 37-38) Hicks' approach opened two paths. The first one was taken by those who distanced themselves from aggregation and kept working with individual agents. It was in this path that the canonical microeconomics model was built, and the idea of microfoundations as bringing together two bodies of knowledge was lost. It was among this group as well that the Sonnenschein, Mantel and Debreu results came about, which made clear the limitations of GET to discuss aggregate behavior.[13] The second path is constituted by fixed-price disequilibrium models, most of which used representative agents, and that both flourished and pretty much died out in the 1970s. For Hoover, these models embody the idea that Hick's composite-commodity theorem is an existence result that opens a window to "explore various aspects of the economy in which aggregation itself is not the key feature" (Hoover 2012: 37-38).

Klein's approach was marked by the priority given to empirical concerns. He proposed "to take both [Walrasian] microeconomic theory and Keynesian economic theory as given, and to work out aggregates that made them compatible with each other" (Hoover 2012: 40). The results of Sonnenschein, Mantel and Debreu also cast a shadow of doubt over the feasibility of finding such aggregates, but at the time this approach offered reassurance. Furthermore, the use of published aggregate data was supported by microeconometric evidence showing that distribution effects were small, and by arguing that they would have such a high correlation with "properly computed aggregates" that they could be interchanged in practice (p. 41). From there, the work consisted in disaggregating the model as much as the availability of data allowed. This strategy produced the Brookings macroeconometric model of the economy of the United States, which had more than 150 equations (p. 45).

Both of these approaches show that the representative-agent program not only is not the first one to reflect on the issue of the compatibility between micro and macroeconomics, but also that it has not actually gotten us any closer to a solution.

[12]See footnote 9 above.

[13]Kirman (1989 and 1992) discusses some approaches within the General Equilibrium Theory framework that attempted to overcome the difficulties, however, GET is nowadays considered as an essentially microeconomic field. Kirman himself is now an advocate of agent-based modeling as an alternative to the traditional way of dealing with microfoundations (see his preface of Colander 2009).

Instead of helping us solve the problems that appeared in the development of the General Equilibrium and macroeconometrics approaches, the representative-agent program simply assumed the problems away.

2.3 Key elements to approach *Good and Bad Trade*

Speaking of the microfoundations of a 1913 book constitutes somewhat of an abuse of terminology since *Good and Bad Trade* precedes the coining of the terms micro and macroeconomics, and it certainly was not part of, nor a reaction to, an effort to bring together Walrasian and Keynesian theory. At a deeper level, however, the problem of relating individual behavior and aggregate results is present in the book and it is addressed, so some form of microfoundations is present. What we have in *Good and Bad Trade* is an example of the way in which this issue was dealt with in a non-formal type of economics, especially interesting for the way in which it addressed the difficulties that modern approaches encountered.

The preceding discussion about microfoundations has revealed that dealing with the heterogeneity of agents is crucial. How it is dealt with —the method used to aggregate agents' behaviors— is at the center of the debate and so far the results are not good. The results obtained by Sonnenschein, Mantel and Debreu showed that the logic of aggregate behavior cannot be immediately deduced from that of the individuals; and if one simply ignores heterogeneity by using a representative agent, the result is a model simply imposing individual rationality on aggregate data. Accordingly, the two big questions that must be asked about GBT are, first, whether heterogeneous agents are considered, and second, how their behavior is aggregated. Additionally, it is important to take into account the criteria guiding the aggregation as well. Whether primacy is given to theoretical consistency or to the availability of data can make an important difference.

3 The microeconomics of GBT

Hawtrey stressed the importance of individual behavior since it was by looking at it that the connection between disturbances in the stock of money (distributed among

different types of agents) and changes in the incomes of agents and prices could be understood. Furthermore, Hawtrey was concerned with the realism of his theory; he wanted to provide a recognizable depiction of the type of economies of his time, and of the types of agents that inhabited them. It was of fundamental importance that the theory approached the real world as much as possible to be useful.[14]

As a consequence a great deal of attention was paid to the details of individual behavior, and this is what I will evaluate in this section. I have two objectives. First, I want to emphasize the complexity of the characterization Hawtrey made of each one of the types of individuals that he uses in his theory. The fact that all aggregate phenomena are traceable back to the behavior of individuals is one of the most appealing characteristics of his theory. However, this is not always easy to appreciate and details are sometimes dispersed through several chapters. Second, I want to evaluate the completeness of the characterization of these types of individuals. Although their characterization is rich and appealing, the individuals Hawtrey refers to usually behave according to rules and conventions whose details are not evident or fully stated.

Both of these points are more clearly seen, I believe, when an effort is made to translate Hawtrey's insights, his theory, into a mathematical model of the behavior of these types of individuals. Following this route makes it easier to appreciate the problem and the constraints faced by each type of individual, as well as the difficulties in dealing with somewhat vague notions like "experience." My goal is not to provide a "Hawtreyian" General Equilibrium model, but to use the language of mathematics to make the complexity of Hawtrey's ideas more evident.

I will only deal with the main types of individuals involved in Hawtrey's theory of trade fluctuations for a closed community with a banking system. Hawtrey developed his argument in GBT methodically: he started with an isolated community with no banking system, then he introduced banks, then he dealt with an international system with independent paper currencies, and finally he discussed the case of an international system

[14] "[t]hough we have demonstrated that, with the assumptions made, the consequences of a monetary disturbance exhibit a remarkable correspondence with the known characteristics of a trade fluctuation, it is only when all artificial assumptions are abandoned and the argument is applied to actual conditions that this correspondence can acquire the force of an inductive proof" (GBT: 175)

with a common metallic (gold) standard. However, as the summary he gave of his argument at the end of the book shows, the main ideas were presented in the case of a closed community with banks (GBT: 267ff). Besides, this reduced set of types of agents is enough for discussing his microfoundations.

The agents I will consider are workers, producers, dealers and bankers;[15] the Government, retailers, traders and the Central Bank will be left out since they do not play a major role at this level. Before dealing with these individuals, however, it is first necessary to make some remarks regarding the environment in which they act. Money occupies an important place in this environment and therefore a discussion of the conception of money present in GBT is necessary.

3.1 The decision environment

Hawtrey's theory is always presented as a "monetary theory" of the cycle, and rightly so. As will be seen in the next section, changes in the quantity of money — understood as cash plus bank deposits— are at the center of Hawtrey's theory of trade fluctuations.[16] However, Hawtrey's theory is a monetary theory in other sense as well: the monetary character of the economy being studied is stressed, and monetary magnitudes constitute de information available to individuals. Money is a preliminary of Hawtrey's theory, and no form of non-monetary exchange is ever considered for any purpose at all. Money is just there, and it constitutes a constraint binding the behavior of every individual in the community. This alone makes it a fundamental piece in a theory of trade fluctuations according to Hawtrey:

> The special importance of money in the theory of trade fluctuations is to be attributed to the fact that all branches of commerce and industry are equally dependent, and dependent in the same way, upon the use of money. Whether the economic influences connected with the use of money are great or small they will at any rate be far-reaching. (GBT: 4)

[15]Hawtrey speaks of bankers and banks indifferently, though the former is used more often.
[16]It was also usually remarked that his theory was a purely monetary one. For example, Haberler indicated that "C'est M. R. G. Hawtrey qui a présenté, sous la forme la plus complète et la plus absolue, l'explication exclusivement monétaire des cycles économiques" (1943[1937]: 17-18). Hansen (1927: 9) and Estey (1941: 16-17) expressed similar views.

This view of money as something that is there from the beginning of the analysis does not mean that it does not deserve any explanation at all. Hawtrey does not offer the logical explanation of the origin of money he offers in *Currency and Credit*[17] but instead focuses on the function carried out by money. To do so Hawtrey appeals to what he identifies as the principle determining the distribution of wealth in the society:

> The general principle by which the distribution is at present governed is that those only are entitled to share in the accruing wealth of society who assist in the production of that wealth, whether through their personal services or by permitting the use of land or capital which is in their control. (GBT: 1)

Money is the instrument through which this principle of distribution is implemented (GBT: 4). The way things work, then, in a community where this apparatus —or machinery, as Hawtrey sometimes refers to it— called money is at work, is that the contribution of a person to the social wealth is measured in money (represented by a monetary income) and the only way this person has to claim his share of the social wealth is by buying it with money (by paying a monetary price). More than the physical expression of money —e.g. a gold coin, a bank-note or a cheque— what's important is its function as a unit of account, and the information it conveys as such: "Money is merely purchasing power" (GBT: 14). In a monetary economy goods and services are comparable because they have a monetary price, and it is on that quality that agents base their actions regarding the rest of agents. Producers, for example, produce goods in response to a monetary demand, an effective demand,[18] because they have to pay monetary wages and monetary prices for their production inputs. As such, then, this system of money and monetary prices organizes economic activity in a decentralized way.[19]

[17]See Diatkine (2002: ch. 6) and Mendez (2012: 184-188) for an analysis of Hawtrey's credit-theory of money as it is developed in *Currency and Credit*.

[18]Hawtrey uses the term in the same sense as Keynes later would in The General Theory (see Glasner 2013: 12-14).

[19]Hawtrey indicated at the end of GBT's introduction: "Although money is not wealth it is a most potent factor in economic organisation. And this is indeed so well recognised nowadays that it is hardly necessary to enter a warning against the prejudice which would condemn as superficial any theory claiming primary importance for purely monetary influences" (GBT: 4-5). He was evidently wrong about the profession's perception of the importance of money, as the opinions expressed by the reviewers of GBT showed.

3.2 The worker

In Hawtrey's description of the economic process households earn an income — wages, rent or interest— according to their specific role in production. I will focus on the worker, who is paid a periodic wage in cash from producers, but the other types of households have an essentially similar behavior. Workers keep a "working balance" of money so that they still have some money left when their wage is paid again. The size of this desired working balance $\tilde{m}$ depends on several factors according to Hawtrey (the direction of the effect is indicated in parenthesis): the magnitude of the wage (+); the periodicity of the payments (-); the cost of daily needs (-); the expectance of unforeseen contingencies (+); the need to make a large payment in a future period or save (+) (GBT: 10-11). The precise size of $\tilde{m}$ is determined by experience if only because the expectance of unforeseen contingencies is determined by experience:

> Of course, no one would set to work to reckon out what those contingencies are, but every one has some practical experience of unexpected disbursements, and one who has gained such practical experience will feel uneasy whenever his money in hand falls below the prudent minimum. (GBT: 11)

The evolution of the actual money balance can be described by equation 3.2.1, using the following variables:

m_t: the working balance at the end of period t.

w_t: wage earned in period t, paid at the beginning of the period.

w_t^s: income derived from past savings, paid at the beginning of t.

c_t: consumption in period t.

s_t: savings made in period t (before consumption) in the form of securities.

ε_t: unforeseen expenses in period t.

$$m_t = m_{t-1} + w_t + w_t^s - c_t - s_t + \varepsilon_t \qquad (3.2.1)$$

The decisions the worker faces concern consumption and saving. The difference between the desired and the actual money balance is the central element in the worker's behavior. If at the end of a period he finds himself with less money than he would like to have he will consume less in order to reconstruct —possibly over several periods— his working balance. If his working balance is just equal to $\tilde{m}$ then he will consume what his daily expenses for the period amount to. Finally, if he ever has a working balance greater than $\tilde{m}$ he might consume part of it, but he might also save. If daily expenses are represented by d_t the consumption function would be:

$$c_t = \begin{cases} f(m_{t-1} - \tilde{m} - s_t) & if\ m_{t-1} - \tilde{m} > \alpha \\ f(m_{t-1} - \tilde{m}) & if\ 0 < m_{t-1} - \tilde{m} < \alpha \\ d_t & if\ m_{t-1} = \tilde{m} \\ f(m_{t-1} - \tilde{m}) & if\ m_{t-1} < \tilde{m} \end{cases} \qquad (3.2.2)$$

Where $s_t = s(m_{t-1} - \tilde{m})$ is also a function of his excess working balance left from the preceding period, and $\alpha > 0$ is a constant that indicates that the worker will only save if he finds that he has been accumulating a surplus over $\tilde{m}$ that has reached such a size that keeping it would be a "useless expense" (GBT: 11). It must be pointed out, however, that although the act of saving and receiving an income from the securities bought in previous periods (w_t^s) is a possibility for the worker, it is a very rare one. Only a portion of workers —those who earn the highest wages, along with capitalists and other rentiers— will actually have the opportunity to save. They will also have a banking account —so their working balances will be divided into cash and deposits— and the possibility to borrow in order to have the desired amount of cash available. On the contrary, the rest of the workers certainly do not have a bank account and their wages are precarious (GBT: 37).

The main difficulty in Hawtrey's account of the behavior of workers, and household in general, concerns the determination of $\tilde{m}$. The fact that its determination is a matter of experience is intuitively appealing, but more information about the mechanism by which a particular $\tilde{m}$ is chosen, and how it evolves as its determinants

change, would be useful especially since changes in prices and wages play an important role in Hawtrey's theory. It would seem that $\tilde{m}$ is not completely constant, as I have assumed in equation 3.2.2, but it does not change each period either. The same goes for the decision regarding consumption, which is barely developed when reference is made to negative shocks to the amount of cash in a community: when cash diminishes all agents will try to rebuild their working balances by reducing consumption (GBT: 38). The opposite case is considered only in passing, and no information regarding how much of the extra money will be consumed or saved is given (GBT: 49).

Hawtrey was evidently not concerned with developing a theory of choice or a theory of demand. While he does briefly indicate that there are elastic and inelastic demands, for goods classed as luxuries and necessities (GBT: 85-86), his attention was centered on the amount of consumption rather than on the composition of it. No theory of portfolio composition is developed either. In Hawtrey's account workers do not follow an optimization program, instead they guide their behavior by a limited set of rules and parameters defined by experience.

3.3 The producer

Hawtrey's depiction of the behavior of producers is equally patchy. Chapter IV of GBT, "Production," focuses on the description of the costs of production, especially wages and capital. There Hawtrey offers some interesting insights into the determination of wages in the labor market, and also a very particular theory of capital which would seem to be based on an underdeveloped labor theory of value.[20] Besides indicating that for the most part producers produce with profits in mind, there is not much to be learned from their behavior in chapter IV. It is when considering monetary disturbances that Hawtrey elaborates on the way producers react to changing conditions.

Profits π^p will be the difference between his sales of product to wholesale dealers z^d at a price p^w, and his costs of production. Assuming production is carried out using only labor L paid at a wage rate w and with money borrowed at a rate of interest i,

[20]I will elaborate on the natural rate in the next section.

and fixed capital for which a fixed rate $\bar{k}$ is paid,[21] the producer's profits in each period would be:

$$\pi^p = p^w z^d - [(1+i)Lw + \bar{k}] \qquad (3.3.1)$$

The producer reacts mainly to changes in the rate of interest i that his banker charges him, and to changes in the demand for stock z^d that he receives from the dealers. If his banker raises i then the producer will raise p^w in order to cover the increase in the cost of production (GBT: 61).[22] Hawtrey does not insist much on this, and the emphasis is put on the changes in price due to changes in the orders made by dealers: when facing a diminution in orders, producers are willing to reduce prices and sacrifice profits as far as costs of production permit (GBT: 63). The reason for this is that producers want to maintain their fixed capital as occupied as possible. The producer must pay $\bar{k}$ no matter what the size of the order made by his customers is, so it is in his best interest to keep his plant as busy as possible so as to minimize the part of his potential profits that would go to subsidize idle capital.

The desired level of occupation of fixed capital, which in Hawtrey's account seems to be the maximum possible, is determined by the technical characteristics of production. At that level an output $\tilde{z}$ would be produced, and it is the difference between $\tilde{z}$ and z_t^d that will be the main cause of changes in price. For a given w and $\bar{k}$ we would therefore have:

$$\Delta p^w = p(\tilde{z} - z_{t-1}^d,\ i_t) \qquad (3.3.2)$$

Where the change in price depends negatively on the difference between desired output and orders from dealers observed at the precedent period, and positively on the interest rate charged by banks on the current period.

[21] The use of fixed capital enters costs of production as a fixed rate because Hawtrey separates producers from capitalists proper. Throughout the book Hawtrey refers to revenue from capital as being fixed, so $\bar{k}$ should be fixed for several production periods. Besides, only wages are paid with borrowed money (GBT: 60) and at the beginning of the production period.

[22] Assuming that he remains with the same bank or is unable to find cheaper money elsewhere. Hawtrey emphasizes the importance of the relationships established between bankers and their clients (GBT: 153).

Two additional remarks must be made regarding the interaction between dealers and producers. First, the fact that production is carried out according to the dealer's orders means that producers do not observe the market directly. In Hawtrey's view it is dealers who form expectations and decide how much can be sold and therefore how much must be ordered from producers. Secondly, this approach to the behavior of producers and dealers tells us the direction of changes in prices, but not enough information is given about the precise way in which the producer arrives at a particular price. Furthermore, it is not clear if a bargaining process is carried out between dealers and producers. The scenario that Hawtrey would seem to describe is one where a producer quotes a price, then produces just what dealers want at that price, and only revises his price in the next period according to how much production orders deviated from $\tilde{z}$ in the precedent period. Another possibility is that after an initial price has been quoted, producer and dealer negotiate a price and quantity demanded that might end up being more beneficial to both. In this scenario producers would not wait until the next period to revise their prices, and therefore fluctuations in fixed capital occupation, output and employment might be less pronounced.

In any case, by looking at equation 3.3.1 it can be seen that in order to propose a price the producer has to estimate a demand curve of dealers. He knows i, w and $\bar{k}$; and L can be seen as a function of z^d. With an estimate of the demand curve of the dealer the producer could find a combination of price and quantity that would give him the maximum profit. With this information he could then change prices based on the estimated elasticity of demand. Hawtrey, however, does not tell us anything about this and the determination of prices is left in the air since dealers form expectations based on the prices quoted by producers. The secondary role played by producers and bankers can be seen in the following quote, where Hawtrey discusses what is actually behind an operation where a producer discounts a £10,000 bill of exchange:

> The whole value of the manufacturer's efforts in producing the goods depends upon there being an effective demand for them when they are completed. It is only because the dealer anticipates that this effective demand for them will be forthcoming that he gives the manufacturer the order. The dealer, in fact, is taking the responsibility of saying how £10,000 worth of the productive capacity of the country shall be employed. The manufacturer, in accepting the order, and the banker in

> discounting the bill, are both endorsing the opinion of the dealer. The whole transaction is based ultimately on an expectation of a future demand, which must be more of less speculative. (GBT: 78)

Wages and the labor market

So far wages have been treated as given, both for the worker and for the producer. While this is accurate for the short-term behavior of these agents, Hawtrey does explain what the forces behind changes in wages are, and why wages do not adjust immediately to changes in prices. Hawtrey defines wages as "the sum which the employer must pay [the worker] for giving up his time" (GBT: 10). At any given moment in time that amount of money is determined by the labor market, that is, a producer looking to hire new employees will have to pay the wage rate determined by the market. But the wage rate at which already employed workers are paid is not necessarily the wage rate that prevails in the labor market if the economy is going through an expansion or a contraction in production —and therefore employment. For Hawtrey, the forces of supply and demand of labor will determine this difference in wages, as well as reduce it to zero: in the case of a contraction of production, the workers employed will be compelled to accept lower wages by the growing amount of unemployed workers willing to work for a lower wage (GBT: 43); in the case of an expansion employers will have to outbid each other in order to obtain the labor they need (GBT: 51). However, in Hawtrey's account there is no way of determining the precise amount of money that must be paid to the worker in order to convince him of "giving up his time." In modern terms, it is not clear how the reservation wage of workers is determined.

The time it takes wages to adjust is a key element of Hawtrey's theory of trade fluctuations. If they adjusted early in the process of expansion or contraction that the producer experiences, fluctuations would be greatly reduced and perhaps prevented (GBT: 266). But neither employers nor workers are willing to accept the immediate changes in wages that would allow prices to adjust to monetary disturbances without producing changes in output and employment. Employers and workers, Hawtrey points out, "do not trust one another enough to make concessions which are ostensibly temporary, but which they fear may become permanent" (*ibid.*). In other words, workers will not accept a cut in wages when prices are falling because they do not believe their

employer will increase it in case prices rise. And accordingly, a producer will not increase wages when prices are rising because he does not believe that workers will take a cut in case prices start falling. In conclusion, in Hawtrey's theory wages are flexible and the pressure exercised by the excess of demand or supply of labor determines the velocity of adjustment. However, his theory is built on the additional assumption that this mechanism works rather slowly.

A formalization of the labor market as depicted by Hawtrey would require, therefore, (1) a clearer theory of decision from which to obtain the reservation wage of workers, as well as (2) a precise description of the mechanism of negotiation between employers and workers. The latter is particularly important since there must be a reason why employers cannot simply impose their will on workers and change wages as they see fit. There is clearly a legal structure determining the bargaining options of each of the parties, and that creates the gap between the labor market and the actual wages of currently employed workers.

3.4 The dealer

The dealer "keeps a stock or 'working balance' of the goods in which he deals. This is necessary to enable him to meet the varied needs of his customers without delay" (GBT: 62). And he borrows the money necessary to maintain his stock of goods from his banker. Therefore, his decision to hold stock is also a decision about how big he is willing to allow his debt with his banker to grow. The size of his stock of goods depends on experience, but can "be varied within fairly wide limits without much risk of inconvenience" (*ibid.*). The evolution of this stock and of the dealer's indebtedness to his banker is expressed by equations 3.4.1 and 3.4.2. The first equation says that z_t, the actual stock of goods —assumed to be not perishable— that the dealer has at the end of period t is the result of: (1) whatever stock he had left from the precedent period; (2) the stock he bought from producers during period t, z_t^d; and (3) the stock he sold during t, z_t^s.

$$z_t = z_{t-1} + z_t^d - z_t^s \qquad (3.4.1)$$

As for the size of this debt at the end of the period, D_t, it will depend on the debt from the preceding periods and on the net result of his indebtedness during the period, $\boldsymbol{D}_t$. To simplify the expression of past debt it will be assumed that all debts are refinanced at the end of each period, so only the size of the preceding period's debt matters. Furthermore, this reflects the idea that dealer loans are short-term loans, a key element that makes them very sensitive to changes in the rate of interest (GBT: 45).

$$D_t = (1 + i_t)D_{t-1} - \boldsymbol{D_t} \qquad (3.4.2)$$

The term $\boldsymbol{D}_t$ depends on the amount of money that the dealer can and is willing to pay. It depends on how much money is left from sales after the cost of the orders of new stock is taken into account. If the cost of the new orders of stock, $(1 + i_t)p_t^w z_t^d$ is equal or greater than the receipts from sales of stock at a price p_t, $p_t z_t^s$, then the dealer has no choice but to add the difference to his existing debt. In the opposite case, the dealer has the opportunity to make a profit. According to Hawtrey, the dealer "expects some of his ventures to fail, and others to bring him more than he counted on. Taking the rough with the smooth he will probably make a profit" (GBT: 78). Exactly how much of his available income for the period he will pay is not clear, but it is likely that it will depend positively on the rate of interest his banker charges him. This proportion appears as $\varphi(i_t) \in (0, 1]$ in equation 3.4.3, which illustrates the reasoning behind $\boldsymbol{D}_t$:

$$\boldsymbol{D}_t = \begin{cases} p_t z_t^s - (1 - i_t)p_t^w z_t^d & if\ p_t z_t^s \leq (1 - i_t)p_t^w z_t^d \\ \phi(i_t)[p_t z_t^s - (1 + i_t)p_t^w z_t^d] & if\ p_t z_t^s > (1 - i_t)p_t^w z_t^d \end{cases} \qquad (3.4.3)$$

Equation 3.4.4 expresses the behavior of prices. Hawtrey does not say much about the determination of the prices that the dealer charges its customers, except that it is limited by the behavior of the price quoted by the producer, and that dealers are likely to

absorb the change themselves if the change in p^w is not so big (GBT: 62). The constant $\beta > 0$ represents the sensibility of the dealer to changes in p^w.

$$\Delta p = \begin{cases} \Delta p^w & if \quad \Delta p^w > \beta \\ 0 & if \quad \Delta p^w < \beta \end{cases} \qquad (3.4.4)$$

Finally, there's the decision regarding z_t^d, the amount of stock ordered from producers. First, the desired stock that the dealer wishes to hold must be considered. I will call it $\tilde{z}_t$ and, according to Hawtrey's account, it is determined by the rate of interest, the price quoted by the producer, and by historic behavior of this last price (GBT: 67). An increase in the rate of interest will make the holding of stocks more expensive, as will an increase in the price quoted by the producer. Yet, if prices have been rising the dealer will want to increase his orders and curtail his sales so as to increase his stock of goods. The desired stock can be depicted as $\tilde{z}_t = \theta(i_t, p_t^w, \Delta p^w)$, where the function θ depends negatively on the first two variables, and positively on the third one. If $\hat{z}_t^s$ represents the expected sales then the orders made to the producer in period t will be:

$$z_t^d = \hat{z}_t^s + \tilde{z}_t - z_{t-1} \qquad (3.4.5)$$

The main problem with Hawtrey's characterization of dealers is that it is not clear how they form expectations. This is an important flaw because, as the quote commented in the last subsection showed, it is dealers who form expectations in the society. They are the ones who get the economic process going, so the understanding of changes in production and indebtedness depends on the prior understanding of the formation of dealers' expectations. As the last part of the quote points out, "[t]he whole transaction is based ultimately on an expectation of a future demand, which must be more of less speculative" (GBT: 78).

Realism and market structure

The existence of dealers as a type of agent is never actually justified in *Good and Bad Trade*, and the impression one gets from reading the book is that dealers are simply an important type of agent in the actual world Hawtrey is analyzing. The one piece of information regarding their existence is that keeping a stock of goods is necessary to be able to "meet the varied needs of…customers without delay" (GBT: 62). So, since production takes time there is profit to be made in having a stock of goods ready for sale. However, this justifies the existence of stocks of goods, not the existence of a special type of agents whose mission is the keeping and management of said stocks.

If, nonetheless, one accepts the existence of dealers and their inclusion in the analysis simply on account of the greater realism it gives to the argument being made, it is still important to have a clear characterization of the relationship between dealers and producers. When discussing producers I pointed out that it was not clear how the negotiation process was carried out between producers and dealers in terms of the information available to each of the parties. Now, what must be remarked is that, if the opportunity for profit exists in the keeping of stocks, there is no *a priori* reason for a dealer to be in business with only one producer. And if a dealer has access to goods produced by several producers he is not immediately constrained by changes in the conditions of a particular producer. Based on the way Hawtrey presents both producers and dealers it would seem that each particular producer does business with only one dealer and vice versa. But if this is the case, there is no evident reason to sustain the separation between producers and dealers. Hawtrey's analysis is missing a clearer characterization of the market structure in which producers and dealers are embedded.

3.5 The banker

For Hawtrey, a bank is "an institution which accepts the liability to furnish money on demand" (GBT: 16). That is, it receives deposits from his customers under the guaranty that they can resume possession of their funds whenever they want to. These deposits, or "credit money" as Hawtrey calls them, are as good as cash for most of the customers' purposes, so they will use them instead of demanding cash from the bank. Both parties profit from this arrangement.

Hawtrey offers a logical explanation of the origins of banks based on the service they provide the rest of agents in the economy, and most notably producers and dealers. In a monetary economy each agent must administer his income so as to pay for his expenses and be able to carry out whatever activity he obtains his income from. For these types of agents a bank alleviates the problems associated with maintaining a large reserve of cash —notably storage and security— while also giving them the opportunity to borrow, therefore reducing the amount of idle balances needed to carry out their productive activities. They might even receive interest on their deposits if they agree to notify the bank before withdrawals. For all this the bank only demands the use of these deposits as if they were his own, and knowing that he does not have to pay them all at the same time, he can lend them and thus make a profit (GBT: 17).

For his analysis regarding banks Hawtrey always assumes that they loan money only by means of creating deposits —not by the emission of bank-notes[23]— which makes granting a particular client a loan as simple as writing a number on a ledger.[24] But deposits are only as good as cash unless the loan is made to pay wages, which can only be paid in cash. This is the principal limitation of the banker's power to create money: the need to have a reserve of cash large enough to meet the requirements of his clients. Simply put, the problem the banker faces is making a profit while honoring his obligation to pay deposits on demand, and his instrument for doing so is the rate of interest he charges on loans.[25]

To illustrate the banker's problem the following variables are needed:

R_t: banker's reserves at the end of t.

C_t^d: cash deposits during t.

C_t^w: cash withdrawals during t.

[23]Therefore cash is composed of legal tender paper money or of metallic coins.
[24]"This is the most distinctive feature of the banking system, that between the stock of legal tender money and the trading community there is interposed an intermediary, the banker, who can, if the wishes, create money out of nothing" (GBT: 56-57).
[25]"In trade a seller encourages or discourages buyers by lowering or raising his prices. So a banker encourages or discourages borrowers by lowering or raising the rate of interest" (GBT: 58).

η_t: difference between the cheques paid by the banker's customers to accounts in others banks, and the cheques received by its customers from accounts in other banks .

i_t: interest rate charged on loans for period t.

L_t: loans granted during t.

L_t^d : loans paid (from deposits accounts) during t.

D_t: level of deposits at the end of t.

$\tilde{R}_t$: reserve the banker judges adequate at the end of period t.

$\tilde{\lambda}$: proportion of cash reserves to liabilities judged adequate by the banker.

The state of the banker's reserves and of his deposits can therefore be expressed in the following way:

$$R_t = R_{t-1} + C_t^d - C_t^w + \eta_t \qquad (3.5.1)$$

$$D_t = D_{t-1} + L_t - L_t^d + C_t^d - C_t^w + \eta_t \qquad (3.5.2)$$

Equation 3.5.1 shows the way in which cash reserves evolve in time. The amount of reserves available at the end of period t is determined by the reserves the banker had at the end of the preceding period, the amount of cash deposited by his clients, the amount of cash that was withdrawn by his clients, and the net result of payments made and received by his clients using cheques. This last term, η_t, from the standpoint of every private bank, is necessarily an amount of cash, both in the case where compensation between banks is carried out at a Clearing House or in the case compensation is carried out with reserves at the Central Bank.[26] In both cases some part of R_t would consist of reserves at one of these institutions, but I will not deal with the problem of the repartition of the bank's reserves as Hawtrey himself does not pay much attention to it.

[26]For both of these institutions compensation can be carried out in the books.

Equation 3.5.2 shows the way in which deposits evolve in time. Since loans are granted by augmenting the deposits of a particular client, the only way in which deposits accrue —besides direct cash deposits— is by granting loans. If each loan paid with cash is seen as first entering the borrower's deposit account and then being paid from it, deposits only diminish when cash is withdrawn or when a loan is paid from the borrower's account. The last term, which indicates the net result of the bank's payments to and from other banks in the form of cheques, necessarily affects deposits since those cheques represent precisely the customer's deposits at his bank.

The first difficulty in the appraisal of the banker's problem according to Hawtrey is the determination of the desired proportion of reserves to liabilities $\tilde{\lambda} \in (0, 1)$ and the associated level of reserves $\tilde{R}_t = \tilde{\lambda}/D_t$. When Hawtrey introduces the banking system in the analysis of a closed community he avoids the problem by indicating that he assumes "a complete banking system in full working order, with a nicely adjusted system of reserves, based on long and carefully sifted experience" (GBT: 56). Therefore, $\tilde{\lambda}$ is assumed to be determined by experience and would seem to be fixed for at least several periods. But the precise learning process that bankers go through in order to find a $\tilde{\lambda}$ they feel comfortable with is not made explicit. Hawtrey only points out that $\tilde{R}_t$ should be enough: (1) to cover one installment of wages (the main reason his clients withdraw cash); (2) to cover the cash requirements for the customer's other needs (ready money); and (3) to face unforeseen contingencies (GBT: 19). Each bank has a record of this information that could be analyzed, and according to the level of deposits at each particular period and the circumstances faced in the following one, the banker could determine the proportion of reserves he feels comfortable with. This would be highly particular information for each bank, very sensible to the particular businesses of its clients, and a priori there is no reason to assume such proportion would be the same or even closely similar for all banks. Hawtrey, nonetheless, offers a "liberal estimate" of 5% for the banking system as a whole (GBT: 20).

The next question is about the determination of the rate of interest that the banker charges on loans. This is the key decision he has to take, and as will be shown in the next section, the key to Hawtrey's theory of trade fluctuations as well. The rate of interest is

the instrument the banker uses to discourage or encourage borrowing, in the exact same way prices are increased or diminished to encourage or discourage sales in a market (GBT: 58). Accordingly, when $\tilde{R}_t < R_t$ reserves are too high and the banker could be earning more money, so he will diminish the rate on interest for the next period. He will increase the rate of interest in the contrary case. The rate of interest the bank charges on loans therefore depends inversely on the difference between $\tilde{R}_t$ and R_t. But knowing just how much to charge on loans —in order to protect or completely use the cash reserves— is more complex than this and requires information the banker can only estimate.

Suppose cash reserves fall below the desired level. When at the end of a period the banker finds he is not satisfied with $\lambda_t = R_t/D_t$, the rate of interest must be increased so as to discourage lending and reduce the liabilities that must be supported with that level of reserves. Looking at 3.5.2 we can see the amount of loans granted[27] L_t will be the variable most directly affected and with the most certainty, but the other determinants of D_t may change as well since the increase in the rate of interest augments the operation costs of the banker's clients. If a function relating the change of deposits to the rate of interest were estimated, it would most likely involve time lags. Assuming the level of cash reserves to remain the same, the inverse of the function would be used to calculate the rate of interest necessary to arrive at the desired proportion of cash reserves to liabilities. However, the level of cash reserves will move as well, although Hawtrey is somewhat ambiguous as to the knowledge that bankers have of this.

When Hawtrey deals with the restoration of bank reserves he discusses the banking system as a whole (GBT: 68). In this setting cash reserves and bank liabilities evolve in the opposite direction: as the amount of credit money (deposits) in the economy diminishes the cash needed for circulation diminishes as well. This behavior makes sense from the macroeconomic standpoint in Hawtrey's theory since the increase in the rate of interest carried out in order to decrease liabilities will have as a result unemployment, and a diminution in prices and wages (see next section). The individual banker might ignore the state of the other bankers' cash reserves and the macroeconomic effects that might be coming in the future, but besides this it is clear that if he is able to estimate the effect of a

[27]The banker prefers to lend freely at the current rate of interest than to ration credit (GBT: 61).

change in the rate of interest on his liabilities he must also be able to estimate a change in his cash reserves. Whether he does a good or bad job at it is another question.

Hawtrey indicates an apparently simpler type of behavior when λ_t falls below $\tilde{\lambda}$. To restore his cash reserves and arrive at the desired $\tilde{\lambda}$ the banker will raise the rate of interest up to i^h, a rate of interest he considers high enough to discourage loans and that will be maintained until reserves are restored and λ_t equals $\tilde{\lambda}$. After that moment, in order to keep the proportion of reserves to liabilities stable, the banker must charge a rate of interest that "coincides as closely as may be with the earning power of money in business" (GBT: 65), which may be called $\hat{\pi}$. In the opposite case, when $\tilde{\lambda} < \lambda_t$ it would make sense to diminish the rate of interest up to a conveniently low level i^l. Hawtrey also indicates, however, that if the abundance of reserves happens in a period of increasing activity, the banker could just as well lend abundantly at the same rate and patiently wait until his reserves are diminished. He points out that an important difference between a period of expansion and a period of contraction is that agents' actions are less constrained (GBT: 70). This possibility could be interpreted as indicating the existence of "patient" and "impatient" bankers. Equation 3.5.3 captures the behavior of the banker according to Hawtrey:

$$i_t = \begin{cases} i^h \quad if \quad \tilde{\lambda} > \lambda_{t-1} \\ \hat{\pi}_t \quad if \quad \tilde{\lambda} = \lambda_{t-1} \\ i^l \quad if \quad \tilde{\lambda} < \lambda_{t-1} \text{ and the banker is impatient} \\ i_t \quad if \quad \tilde{\lambda} < \lambda_{t-1} \text{ and the banker is patient} \end{cases} \tag{3.5.3}$$

According to Hawtrey's characterization, these magnitudes are all determined by the banker's experience. The banker has data that can be used to do so, but it would seem that the effectiveness that the banker has in applying his experience is uneven. For instance, since Hawtrey never discusses how the banker arrives at that high rate of interest needed to discourage loans, we can only assume that if the bank fails to reduce loans as much as he wanted he will revise i^h upwards. It may also be that he realizes that he stood on the brakes too hard, and revises i^h downwards after some periods. A banker would then be expected to periodically revise his actions, and would most likely have

some degree of insensibility to differences between $\tilde{\lambda}$ and λ_t that are not important enough.

Bankers do what they can with the information they have: they "work in the dark...[and] adjust their actions to the facts within their cognisance, that is to say, to the state of their own assets and liabilities" (GBT: 191). They can make mistakes, and in fact they often do since they lack the necessary information about their clients and the state of the world. The most important way in which the banks systematically err is in the calculation of the behavior of their reserves. Since they do not anticipate —correctly, or at all— the lag between the adjustment in deposits and the adjustment in reserves, they will find themselves with either excessive or deficient reserves after wages have adjusted. From the perspective of the banking system as a whole this is, according to Hawtrey, the main cause of the recurring nature of the trade cycle. From the perspective of the individual banker it is sensible to accept that he has no way of knowing how the adjustment of prices and wages in the economy as a whole will turn out; however, regarding his clients, he can check on the behavior of their demands rather regularly.[28] If wages are paid weekly, as Hawtrey supposes along the book, it is difficult to see how major forecasting errors, and therefore major disturbances, could be produced. It is possible that such disturbances might result from the type of behavior and limited information resources that Hawtrey attributes to bankers,[29] but the mechanisms that might cause them are at best vaguely discussed.

3.6 An evaluation of GBT's microeconomics

In this section I have tried to show evidence of the attention that Hawtrey paid to individual behavior, which is demonstrated by the complex characterization of individual agents that he presents. It has also been shown, however, that this characterization of agents, though effectively rich and complex, is incomplete and rather vague. *Good and*

[28]Furthermore, if the relationships between a banker and his customers are as close as Hawtrey makes them out to be (GBT: 153), each banker would have a good knowledge of his clients activities —or at least very long series of data from where to deduce it.

[29]Hansen endorses this opinion by indicating that disturbances in business will fail to adjust themselves since "adequate foresight" and "systematic unified control" are missing in a decentralized society (1927: 1999).

Bad Trade offers some interesting insights into the behavior of agents, but as far as microeconomic analysis goes Hawtrey only offers us the foundations of what could be an interesting edifice. Two elements stand out regarding the incompleteness and vagueness of Hawtrey's analysis.

First, the importance of the monetary character of the economy was not fully developed. Money is crucial because it is the kind of information available to agents, but it is not completely clear how these agents process it. In particular, it is not completely clear how agents react to changes in prices nor how monetary prices themselves are determined. Furthermore, the focus on the function of money in the society as an implementation of a principle of distribution —where only those who contribute to the production of wealth are given a part of it— was not fully developed either. In this kind of approach money appears as a way of keeping score of the contributions to, and the withdrawals from, the wealth of the community. Money appears as a bookkeeping technology.[30] It is not completely clear in Hawtrey's exposition, however, how this view of the role of money is compatible with the existence and the predominant role that banks have in the economy due to their capacity to create money "out of nothing." Banks and dealers —since it is to them that the loans are given to— would seem to scape, or at the very least bend, the rules of the principle of distribution that Hawtrey sees at work in the society.[31]

Second, the notion of experience is clearly very important in the characterization of agents' behavior, but it is not clear precisely what it is and how it works: it is not clear how agents process information and learn from past events. A key characteristic of the behavior that Hawtrey describes is that it is guided by the desire to keep a particular variable (e.g. the level of stocks for dealers, or the ratio of reserves to liabilities for bankers) close to a desired value defined by experience. Agents, therefore, do not follow an optimization problem but instead follow a pre-established rule that allows them to face a changing environment and approach their desired level for the particular variable they

[30] See Spahn (2007) for a critical discussion of the place that the idea of money as a bookkeeping device has had in the history of economic thought since Galiani. Although he does not include Hawtrey, the conception of money present in GBT fits in fairly well in Spahn's argument.

[31] It is possible to incorporate banks into a bookkeeping approach to the function of money in society. Schumpeter did so with the theory of social accounting he developed in his *Theory of money* (Lakomski 1999).

are concerned with.[32] This type of behavior escapes the equilibrium discipline demanded by new classical macroeconomists; it also fails to comply with the less restrictive "Hayek-Patinkin" requirement for microfoundations that De Vroey (2012) describes as requiring only that plans —and not results— be optimal. Agents' behavior in *Good and Bad Trade* is closer to the bounded rationality approach, where the computational and informational limitations of agents, as well as the process leading to the establishment of alternative courses of action are given primacy (Simon 2008). In retrospective, Hawtrey's insights are interesting and it is clear that he was onto something, however, the vagueness of his notion of experience gives his characterization of individual behavior a shaky basis that is evident once an effort is made to model it.

4 The macroeconomics of GBT

Contrary to the micro side, I believe it would be difficult to deny the macroeconomic label to the theory developed by Hawtrey in *Good and Bad Trade*. Hawtrey is one of those economists that, like Dimand (2008) points out, "wrote macroeconomics long before they called it by that name." Both in the themes treated and in the scope of the analysis, GBT is clearly a book about macroeconomics since it offers a theory of the economy as a whole and treats all the usual macro themes (fluctuations in output and employment, inflation, the rate of interest, the exchange rate, etc.). The main difference with what we usually identify as macroeconomic theory today is the lack of a formal mathematical model.

In this section I will present Hawtrey's theory of trade fluctuations an its relation to the Quantity Theory. Then, I will briefly summarize the formalization proposed by Mendez (2012), which gives us an idea of the type of macroeconomic model that can be produced from Hawtrey's depiction of the economy. I will conclude with an evaluation of Hawtrey's macroeconomics centered on the main traits that distinguish modern macroeconomic theory.

[32] As I mentioned above, comparisons between Marshall and Hawtrey are controversial. However, the type of behavior that Hawtrey describes is similar in nature to the "routine rules governing the adaptation of agents to a constantly changing market environment" that Leijonhufvud calls "Marshall's laws of motion" (Leijonhufvud 2006: 61).

4.1 The theory of trade fluctuations

Hawtrey advanced the gist of this theory early in the book: it is disturbances in the stock of money (cash and deposits) that cause trade fluctuations. And he develops this idea in four different stages, from the simplest isolated community without banks to an international system with a common metallic money. For the purposes of this essay the second type of community presented, an isolated community with banks, is enough.

Several remarks are in order. In the first place, Hawtrey barely mentions retail sellers, focusing on the intermediating function of wholesale dealers. Secondly, although the interaction between traders and banks is mentioned when analyzing the behavior of the latter, they do not appear in the explanation of trade fluctuations. Traders make the market for securities —which allows the transformation of savings into investment— and are analyzed in chapter XVI, in which the origins and reach of financial crises is treated. Thirdly, there is no mention of the central bank because it does not appear in the explanation of trade fluctuations for this type of community. The central bank plays its role only when the international system is considered, and especially for the final case of a common metallic unit.[33] Fourthly, all of these agents present in the community are connected to the Government, however, it does not play any role other than being the source of a possible exogenous shock to the stock of money (collecting a tax that is never spent). Finally, the relevant distinction between households is whether they have a bank account or not. It is assumed that workers do not have bank accounts and therefore their wages are paid in cash (coins or paper money). These households represent the main demand for cash in the community.

The starting point is a stationary state, conceived as

> ...a perfectly stable condition of society in which the birth-rate and death-rate are equal; in which the aggregate income, the stock of money, the aggregate of bank balances, the scale of prices, are all constant; in which all tastes, all demands, all processes remain unchanged ; in which capital is always sufficiently renewed and replaced, but never extended ... (GBT: 34)

[33]The analysis of the behavior of the central bank is considerably underdeveloped by comparison with Hawtrey's later works. See de Boyer & Solis (2003, 2011) for a discussion of Hawtrey's ideas on the function of lender of last resort.

This is a society completely devoid of trade fluctuations, in which the profit rate and the bank rate are equal to the natural rate of interest, which is a technical property of capital according to Hawtrey. Banks are at the origin of trade fluctuations since it is their inconformity with their level of reserves over deposits (λ) that starts the whole process. A depression is caused by the following chain of events:

1. Considering that λ is too low, banks will raise the rate of interest they charge in order to curtail borrowing and reduce their liabilities.

2. This raise in the rate of interest will affect both producers and wholesale dealers of commodities, but since it is assumed that the latter finance their stock of goods with loans, it will hit dealers harder. In their effort to reduce their indebtedness dealers will reduce orders to producers.

3. Producers will lower prices as much as production costs permit —sacrificing profits— to counter the slackening of demand, which will allow dealers to lower prices themselves.

4. This lowering of prices will not, however, induce an increase in sales. At the same time that dealers and producers are reducing their indebtedness to banks, these are reducing the size of their liabilities by reducing loans. Employment will diminish, which means that the amount of money in the hands of the public will diminish as well, contributing to a decrease in the demand for commodities.

5. Banks will stop discouraging loans when they are satisfied with the level of reserves. To maintain this level of reserves they must maintain the rate of interest equal to the rate of profit so as to discourage temporal borrowing. At this point demand has been reduced and the pressure to reduce prices as a consequence of the slackening demand will have produced unemployment and a pressure to reduce wages. Production will also be below the normal level. Prices need to be reduced in the same proportion as the total stock of money in the community, but this reduction is impossible as long as wages are not reduced as well.

6. The final equilibrium will be attained when prices and wages have diminished enough to restore the equality between the rate of interest, the rate of profit and the natural rate.

Fluctuations could also be occasioned by external shocks (like a tax collected by the Government that is not spent) but banks would still play the key role: the reconstitution of money balances would diminish the reserve/liabilities ratio and the process that has just been described would ensue. However, the key element in Hawtrey's theory is the instability of equilibrium. In the first place, the lag separating the adjustment of λ and final adjustment of wages and prices poses a challenge for banks: unless they can foresee the evolution of wages with absolute precision, they will face an unexpected diminution in the demand for cash and will expand their liabilities accordingly, giving rise to the upswing of the cycle (GBT: 74-76). Furthermore, if by chance equilibrium were attained, it is very fragile. Any deviation of the profit rate, an increase for example, will be enlarged by the now relatively cheaper credit. This expansion of credit will increase prices, and therefore profits, forcing banks to eventually intervene by raising the rate of interest to protect their reserves (GBT: 76-77). Each disturbance contains the seed of the next and disequilibrium is the normal state of the community.

4.2 The Quantity Theory

The place of the Quantity Theory in *Good and Bad Trade* is not completely clear: some elements approach GBT's argument to the Quantity Theory while others mark an important distance from it. The analysis of the effects of changes in the stock of money over production and prices, between equilibrium positions, are as close as it can get to the Quantity Theory:

> ...if the adjustment [to a change in the stock of money in the community] could be made entirely by a suitable diminution of wages and salaries, accompanied by a corresponding diminution of prices, the commercial community could be placed forthwith in a new position of equilibrium, in which the output would continue unchanged, and distribution would only be modified by the apportionment of a somewhat larger share of the national product to the possessors of interest, rent, and other kinds of fixed incomes ... If the habits of the community are adapted without delay to the change, the production of wealth will continue unabated. If customary wages and customary

> prices resist the change, the adjustment, which is bound to come sooner or later, will only be forced upon the people by the pressure of distress. (GBT: 41)

Therefore, between equilibrium positions, changes in the quantity of money end up being neutral, the only minor disturbance being induced by the existence of fixed incomes. Changes in the stock of money do not alter the structure of production (relative incomes and prices) or the rate of natural interest, which is a key element that evidences the role of the natural rate and its difference between Hawtrey's and Wicksell theories. In GBT the natural rate of interest is nothing but a characteristic of equilibrium, one that summarizes it: we may say that the economy is at an equilibrium when both the profit and the bank rate are equal and prices are not changing; at this value, the profit and the bank rate are equal to the natural rate. The natural rate is a "physical property of the capital actually in use," and is defined as the "ratio of labour saved per annum to labour expended on first cost" (GBT: 66). As in Wicksell's theory, the natural rate depends on technological changes —in so far as they increase labor savings— but it is not the main driver behind trade fluctuations.[34] In *Good and Bad Trade* the natural rate plays a rather passive role, trade fluctuations being caused by discrepancies between the actual profits of businesses (the profit rate) and the rate of interest charged by bankers (the bank rate).

On the other hand, *Good and Bad Trade* departs from the Quantity Theory in two important ways. The first is a practical one: changes in the stock of money may not affect the structure of production between equilibrium positions, but the truth of the matter is that the economy is inherently unstable and it is very rarely at equilibrium. The focus must therefore be on the behavior of agents outside equilibrium rather than on comparative statics. Secondly, an important theoretical difference exists due to the emphasis that Hawtrey places on changes in incomes: the key to his theory is not the change in the aggregate stock of money itself, even if he initially presented it in that way,[35] but rather who experiences these changes and how does it alter his behavior. Such an intricate characterization of the economy, including multiple types of agents, would not have been necessary otherwise. As Marget (1938-42 vol I: 309, 340ff) and Bridel

[34] "[T]he progress of invention may be rapid now and then in one particular industry, but it is rarely widespread enough to have any very marked or sudden effect on trade as a whole" (GBT: 31).
[35] In the introduction to *Good and Bad Trade* he indicated that "[t]he general result up to which I hope to work is that the fluctuations are due to disturbances in the available stock of money"(GBT: 3).

(1987: 57) point out, this puts Hawtrey in the camp of the "income approach," a way of looking at the relationship between money and incomes that goes back at least to Tooke.[36]

It is interesting that when Hawtrey points out the use of the Quantity Theory in *Good and Bad Trade*, in the 1962 preface, he refers to the proportionality between changes in incomes and cash balances. Hawtrey states that "[m]uch of the analysis in this book employs the quantity theory of money in a crude form: a change in the income of a section of the community is assumed to mean a proportional change in its cash holding and *vice versa*" (GBT: viii). This is a rather unusual way to describe a "crude" use of the QT since one would expect the proportionality postulate to tie the stock of money proper and prices, and not incomes and cash balances.

4.3 A macroeconomic model

Chapters V and VI of Mendez' (2012) thesis approach Hawtrey's macroeconomic theory[37] in order to study its main conclusions, most notably regarding Hawtrey's idea of the instability of credit. To do so Mendez presents a mathematical model of Hawtrey's macroeconomic theory and explores its main properties. Although the model is not fully developed and the formalization is used mostly as an exploration device, it does capture Hawtrey's basic insights and his way of approaching aggregate phenomena. Much like in Hawtrey's narrative accounts of the processes taking place, Mendez' model deals with aggregate behavior while justifying it by referring to individual motivations, without taking them into account explicitly.

The equilibrium of the monetary part of the model is described by four equations (Mendez 2012: 252ff). All of the variables represent aggregates, except α and l, which are parameters —although they are parameters tying aggregate variables; capital letters refer to monetary variables and small letters to real variables. Equation 4.3.1 indicates

[36] Writing in 1938, Marget stated that Hawtrey and Schumpeter were the writers that had "done most to provide us with an 'income theory' in a really usable form" (Marget 1938-42 vol I: 309).

[37] As exposed mainly in the third edition of *Currency and Credit* (Mendez 2012: 184).

that $\overline{M}$, a given quantity of cash, is divided between the cash held by the public, M_c, and the cash held at the banks as reserves, M_b:

$$\overline{M} = M_c + M_b \qquad (4.3.1)$$

Equation 4.3.2 indicates that M_c is a fixed portion α of the amount of deposits held at the bank, D:

$$M_c = \alpha D \qquad (4.3.2)$$

Equation 4.3.3 indicates the equilibrium of banks' balance sheet. Deposits are equal to the cash kept as reserve plus the loans given to dealers and that constitutes the latter's level of indebtedness, B:

$$D = B + M_b \qquad (4.3.3)$$

Equation 4.3.4 indicates the constraint faced by banks determined by l, the required ratio of cash to deposits:

$$B = (1 - l)D \qquad (4.3.4)$$

The real part is composed by two equations depicting the equilibrium of consumers and dealers. Producers are assumed to distribute all of its receipts among employees,[38] a sum which equals the whole income of the community and is necessarily equal to its demand for the good produced, $L(y)$, at a price P. Since the income earned is present in the form of either cash or deposits, it follows that:

$$PL(y) = M_c + D = (1 + a)D \qquad (4.3.5)$$

For the dealers, their desired level of indebtedness B_d will depend on the level of production y, the rate of interest charged by the banks r, the mark-up they charge on the price of goods mP and a constant φ that indicates that B_d is a multiple of their profit (Mendez 2012: 209). The level of desired indebtedness would then be $B_d = \varphi(ymP - rB_d)$, and after solving for B_d we obtain $B_d = \frac{\varphi ymP}{1+\varphi}$. At equilibrium we would have that the stock of goods $s = \frac{B}{P}$ is equal to $\frac{B_d}{P}$, so:

[38] Producers are also assumed not to accumulate capital or to keep a stock of goods or money (Mendez 2012: 191).

$$S = \frac{B}{P} = \frac{m\varphi y}{1+r\varphi} \qquad (4.3.6)$$

Equations 4.3.1 through 4.3.4 allow us to solve for Mc, M_b, D and B. For a given level of production, the level of prices is then determined by 4.3.5. Finally, equation 4.3.6 gives us the rate of interest.

Mendez' formalization offers a full picture of the aggregate relationships between the types of agents in the economy from which further analysis can be carried out. For example, Mendez uses it to explore the limits to the accumulation of stocks by dealers, and the scenario of a pure credit economy (2012: 232ff). Four our purposes, related to Hawtrey's theory as presented in *Good and Bad Trade* an important remark is in order. The model allows us to see how an equilibrium in a ``Hawtreyian" model might look like, in particular for the rate of interest, however, in this model the rate of interest is endogenous because Mendez assumes the level of production y to be given. Since equations 4.3.1 to 4.3.4 form a fully determined system that gives solutions for Mc, M_b, D and B, equations 4.3.5 and 4.3.6 must account for P, y, and r. From the standpoint of *Good and Band Trade* it would be necessary to take r as a natural rate exogenously determined by the state of labor-saving technology, but that would mean that different equilibriums would have different combinations of production and prices which would contradict the dynamics presented at the beginning of this section, where only prices differ between equilibrium positions. Mendez' model helps us see that the concept of a "natural rate" in Hawtrey's macroeconomics is not straightforwardly compatible with the rest of his propositions. It helps us understand why Hawtrey abandoned it in posterior work (Mendez 2012: 255; Deutscher 1990b: 50).

4.4 An evaluation of GBT's macroeconomics

De Vroey (2009: 17) proposes a set of characteristics of modern (i.e. post *General Theory*) macroeconomics that can be used to discuss Hawtrey's theory. These characteristics are not all present in all of the modern macroeconomic theories, but they do serve as a guide to what is usually found in them. The five defining characteristics are the following:

1. It is a branch of general equilibrium theory, understood as the study of the economy as a whole.
2. It deals with simplified general equilibrium models.
3. It deals with questions of economic policy.
4. It aims at empirical verification.
5. Macroeconomics is formal: it is expressed in mathematical models.

Good and Bad Trade is certainly a study of the economy as a whole. Hawtrey's argument involves all the parts of the economy and not just a sector. Furthermore, his theory is expressed in terms of the behavior of groups of actors and a picture of equilibrium of the aggregates can be derived from it, as Mendez' formalization shows. Hawtrey's macroeconomic theory complies with the first two characteristics of modern macroeconomics. Regarding the third characteristic, one can use Hawtrey's theory to discuss economic policy, but he was not aiming at offering solutions when he conceived of it. It is for this reason that GBT's last chapter, titled "Can trade fluctuations be prevented," contains a discussion of some of the contemporary proposals instead of Hawtrey's own solutions.[39] *Good and Bad Trade* offers a set of ideas that serves as a tool to make sense of the phenomenon of trade fluctuations, and as such it complies with De Vroey's third characteristic, even though Hawtrey did not use it to test or offer a particular solution.

The last two characteristics mark the real difference between the macroeconomics of *Good and Bad Trade* and modern macroeconomics. In the first chapter Hawtrey pointed out that he

> …shall not attempt to work back from a precise statistical analysis of the fluctuations which the world has experienced to the causes of all the phenomena disclosed by such analysis. But I shall endeavour to show what the effects of certain assumed economic causes would be, and it will, I think, be found that these calculated effects correspond very closely with the observed features of the fluctuations. (GBT: 3)

[39] "It is not part of my purpose to propose remedies for the mischief traceable to trade fluctuations. But, nevertheless, a brief discussion of the few remedies which have from time to time been proposed for an evil which there seems but little hope of curing will not be out of place" (GBT: 255).

Hawtrey was aiming at a qualitative resemblance between his argument and "the well-known characteristics of actual trade fluctuations" (GBT: 53). Rather than verification, his theory aimed at verisimilitude, or realism; hence the choice of multiple types of agents and the attention paid to their behavior. A direct confrontation with data was not intended. Later empirical evidence greatly weakened Hawtrey's case for the importance of dealers and the short-term bank interest rate, although the literary presentation of his theory made precise testing complicated and not always conclusive (Deutscher 1990b: 219ff).

Finally, the lack of a mathematical model is the most evident difference between *Good and Bad Trade* and modern macroeconomics. Mendez' formalization gives us an idea of what a purely aggregate Hawtreyian model might look like, but it is clear that the intricate dynamics that Hawtrey put in words are not easily modeled. Difficulty, however, is only partly to blame for the lack mathematical models based on Hawtrey's theory. To it Deutscher also adds that the model builders of his time were not very interested in Hawtrey's ideas due to its emphasis on the monetary causes (Deutscher 1990b: 229).

5. An evaluation of GBT's microfoundations

Good and Bad Trade belongs to a period where economics had not yet been conceptually divided into micro and macroeconomics, so bridging these two fields of analysis was not something Hawtrey was aiming at. This does not mean, however, that the question of the connection between individual behavior and aggregate phenomena is not posed in GBT. Hawtrey's first book may not belong to a defined microfoundational program, but his concern with the relation between micro and macro does put him close to the "prehistory" of microfoundations. He may not have been as explicit in *Good and Bad Trade* about the relationship between micro and macro as were the figures Hoover (2012) identifies as belonging to this period —Frisch, Keynes and Hicks— but the question was present in the book nonetheless. Furthermore, Hawtrey offered a way of dealing with this relationship that, though not straightforward, does allow for space to take the heterogeneity of agents into account. How the question about the relation

between individual behavior and aggregate phenomena is posed in GBT, and how it was dealt with are the themes of this final section.

The motivation behind *Good and Bad Trade* was completely macroeconomic in nature: to understand unemployment we must understand trade fluctuations. To be able to approach them, however, it was first necessary to make sense of them, to have a representation of these fluctuations. And given the monetary character of the economy, Hawtrey was interested in studying these fluctuations as fluctuations in the total income of the community.[40] The need to look at individual's behavior, and its connection to aggregate phenomena, is arrived at when the question about the relation between the stock of money and total income is posed. At any given moment the stock of money represents a particular proportion of aggregate income, and what is needed is an explanation of this proportionality:

> If a community whose aggregate money income amounts to an average of £40 per annum per head of population requires a stock of legal tender money equal to an average of £4 per head, there must be some reason why a stock of £20 a head is not required, and why a stock of £l is not enough. There must be some reason why with £4 a head the income comes to £40, not £400 or £4 per annum per head. (GBT: 9)

The solution is to look at the way in which the money in circulation is used, which leads Hawtrey to study individual behavior since every part of the stock of money (cash and deposits) in an economy is always in the possession of some agent (GBT: 22). It is therefore only by looking at the way in which all of the types of agents present in the economy act, and by tracing its effects, that we can know what happens at the aggregate level. As was mentioned above regarding the place of the Quantity Theory in *Good and Bad Trade*, more than just asking what happens when the stock of money changes, the important thing to know is where this change is produced (bank's credit money) and in what way it affects agents' incomes and prices.

Dealing explicitly with all the individuals inhabiting the economy and their particular interconnections is very demanding, and even more so if the exposition is purely narrative. Hawtrey dealt with this by referring to the behavior of agents grouped by type (dealers, bankers, etc.) so the book is full of arguments of the following form:

[40] This is the main theme of chapters II and III of *Good and Bad Trade*.

"When **A**s face a higher/lower **x** than they are comfortable with they react by increasing/decreasing their **y**, which causes **B**s to increase/decrease their **z**. The amount of **x** that **A**s are comfortable with depends on **v**, **w**…" This type of argument has two characteristics that are relevant for a discussion of the relation between micro and macro: (1) it is both microeconomic and macroeconomic at the same time, and (2) it seems to allow for some heterogeneity among individuals of a same group although it does not say exactly in what way it matters.

First, such type of statement is both micro and macroeconomic at the same time because it refers to both dimensions of the analysis. On the one hand, it gives us information about the behavior of that type of agent: it says that **A**s take into account information in the form of variables **x**, **v**, and **w**, and they act on variable **y**. It is possible in this way to have an idea of the behavior of the individuals belonging to that group.[41] On the other hand, this type of statement is also macroeconomic because it immediately shows what happens to key variables of the economy since it involves large sections of it. For example, when Hawtrey writes that following a rise of the rate of interest by bankers —to protect their reserves— dealers will want to reduce their indebtedness and therefore order less from producers, we are getting an argument where the rate of interest of the economy, the stock of money, the stock of deposits, the production level (and therefore the employment level as well) are involved.

Second, by always referring to the behavior of collections of agents grouped by type, Hawtrey would seem to indicate that what matters the most is the direction in which the agents of that group act, and not so much the distance that each of the individuals composing that group travels. For example, when Hawtrey writes that bankers raise the rate of interest to protect their reserves, it is clear that such a statement is true whether they all raise it by the same amount or if half of the bankers go from 4% to 5% and the other half goes from 4% to 4.1%. Since all bankers react to the same type of variables a change in these variables should produce a reaction in the same direction in all of the bankers. Furthermore, the resulting level of loans is expressed in a common unit and can

[41] This is the characterization of the behavior of worker households, producers, dealers and bankers that was presented in section 3.

therefore be expressed as an aggregate result easily. It might seem therefore that Hawtrey respects the heterogeneity of agents at least partially.

However, when we look closely at the way in which the heterogeneity can manifest itself we see that in his account of the dynamics between the different types of agents Hawtrey does not actually care much for it. It is only after having built his core theoretical argument[42] that he deals with deviations introduced by the heterogeneity of agents. His method for dealing with heterogeneity can be seen as consisting of two steps: in functional terms, the first step disregards heterogeneity and identifies the main dynamics under the assumption that all the agents of the same type behave essentially as one agent; the second step introduces the nuances required to take differences among the individuals of a same group into account. This two-step process can be identified at least partially for all the types of agents considered, but it is the treatment of bankers —whose behavior received the greatest attention from Hawtrey and are central to his explanation of trade fluctuations— that offers the clearest illustration of it.

In chapter III, when discussing the logical origins of banks, Hawtrey introduces the Central Bank as the institution that allows commercial banks to cope with demands for gold. It is presented as superior to the possibility of coordination among bankers themselves (GBT: 20-21). However, after having said this, Hawtrey develops his main theoretical argument about trade fluctuations in a closed economy with banks but without taking into account the Central Bank or the possible problems of coordination. Instead, as Hawtrey himself pointed out in chapter XIII, the argument developed in the previous chapters "always assumed the banks to respond as a whole to the various influences of the money market" (GBT: 158). The behavior of banks in Hawtrey's core theoretical argument is therefore assumed to be that of a perfectly coordinated group of private bankers, who act more like an enormous bank with multiple branches than as a collection of independent private bankers. In this scenario, where the banking system can be said to have only one head making the decisions, the type of behavior to which Hawtrey attributes trade fluctuations could arise and have the described effects because its

[42] That is, the theory of trade fluctuations that was described in section 4.1 and that Hawtrey summarizes at the end of his book (GBT: 267ff)

decisions and errors will affect the economy as a whole. This is the first step of the process.

If, however, we try to imagine a disaggregated banking system where each bank behaves independently, the aggregate picture that emerges is not as clear. In the discussion carried out in section 3.5 it was noted that the desired ratio of reserves to liabilities $(\tilde{\lambda})$ is a result of each banker's experience with his customers, and that he may reconsider his decisions regarding changes in the rate of interest. These are two elements where taking into account heterogeneity of agents explicitly can lead to significantly different results. If the banking system as a whole errs in its estimation of the needs of cash of producers and then increases or decreases its rate of interest to correct the situation, the whole economy would be involved and a fluctuation would ensue. In a scenario where there are independent private banks, of different sizes and locations, dealing with customers from various sectors of production, etc., we would see a variety of desired $\tilde{\lambda}$s as well as a variety of "low" and "high" rates of interest charged on loans. In such a heterogeneous scenario the kind of unisonous movement needed to produce fluctuations would be an extraordinary coincidence. Furthermore, cash is returning to banks rather fast since wages are paid weekly and loans to dealers are short-term loans, so bankers would have frequent chances to check and correct their behavior.

This does not automatically invalidate Hawtrey's core results, but it does indicate that they are incomplete. In order to account for the type or results suggested by Hawtrey's theory further analysis of the dynamics inside the banking system is needed. This is the second step of the process. A conclusion of section 3.5 was that even taking into account the deficiencies in information, it was not easily understandable how banks would fail as systematically as Hawtrey's theory suggest. If we take the same argument to the level of the whole banking system, what becomes necessary is (1) an explanation of the type of mechanisms that can transform a small mistake of a particular banker or group of bankers into something worse, and the failure of a group of banks into a general crisis of the banking system; as well as (2) the mechanisms acting in the contrary sense.

Hawtrey made several remarks regarding the ways in which differences among bankers manifested themselves, and about the reasons that turn individual problems into systemic problems:

- Other bankers will only lend to a banker in distress if they judge his position to be sound (GBT: 81-82)
- Larger banks are less susceptible to take part in unsound business and they have a larger sense of responsibility than the smaller ones (GBT: 172, 201)
- A signal of distress from a weaker bank may be what triggers other banks' change in behavior (GBT: 176)
- The structure of the banking system is important in determining the bankers' point of view (GBT: 193)
- Prudent bankers cannot "guard themselves against the consequences of their neighbors' rashness" and not even the Central Bank can accurately know if there is over-speculation (GBT: 202)

These remarks allow us to judge what may happen when we depart from the benchmark argument constructed without taking heterogeneity into account, but Hawtrey did not treat them as systematically as the first scenarios he considered, and none of them made it into the summary of his theory (GBT: 267ff).

The same lack of development is present in his treatment of the behavior of the Central Bank, which Hawtrey nonetheless saw as vastly superior to any other form of coordination between banks for preventing difficulties.[43] Its treatment in *Good and Bad Trade* is reduced to pointing out its function as the ultimate responsible of the gold reserve of a country (GBT: 22), but the way in which such a mission is carried out is signaled as being "a matter of practical experience, upon which it would be useless to dogmatize *a priori*" (GBT: 162). Hawtrey only indicates that this reserve must be big enough to withstand a drain of gold for the time it takes whatever measures the Central Bank adopts to act (*ibid.)*. The Central Bank is introduced only when an international system is considered; it was not included in the summary of the theory either.

This way of dealing with heterogeneity is perfectible, all the more since the other groups of agents did not receive as much attention as bankers did. However, given the means available at the time to discuss such complex dynamics, Hawtrey's choice is a

[43] Hawtrey held strong views regarding the lack of a Central Bank in the United States, which had "as unsound a banking system as could well be devised, a system which might have been planned by a perverse ingenuity for the express purpose of causing violent oscillations of trade" (GBT: 264).

rather effective way to state a general theory and pay attention to peculiarities as well. The benchmark argument acts as what Leijonhufvud defines as "theory," that is, "a set of beliefs about the world and about how best to understand it" (2006: 72). And as such, it can only go so far in the treatment of heterogeneity among collections of agents of the same type. The determination of the pertinent deviations from the benchmark argument are left to the discretion of the economist and the institutional peculiarities of the economy being studied.

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